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GB 2021709 A

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(54) Friction clutch driven plate

(57) A friction clutch driven plate 10, fig 1, comprises a hub 11, at least one carrier plate 13 and two friction facings 14, 15 which face in opposite directions, the friction facing 14 having a different contact area 19, fig 3, than the other facing 15, with the contact area 19 extending radially outwardly of the contact area 21 of the other facing 15. The other facing 15 has its contact area 21 extending radially inwardly of the contact area 19 of the first facing 14.

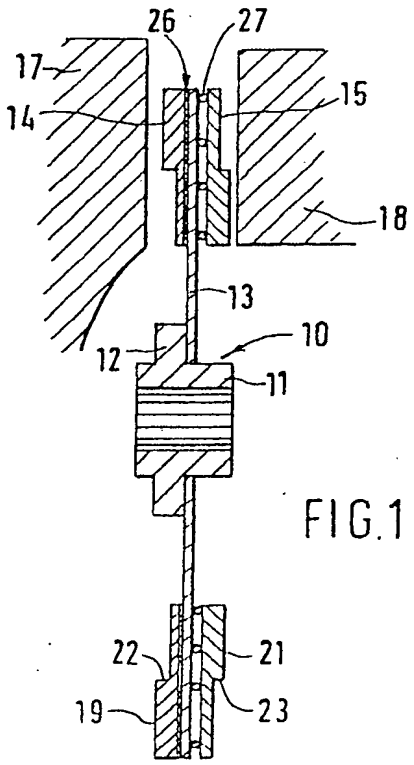

FIG.1

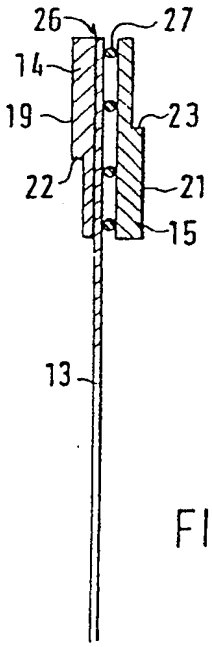

FIG.3

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

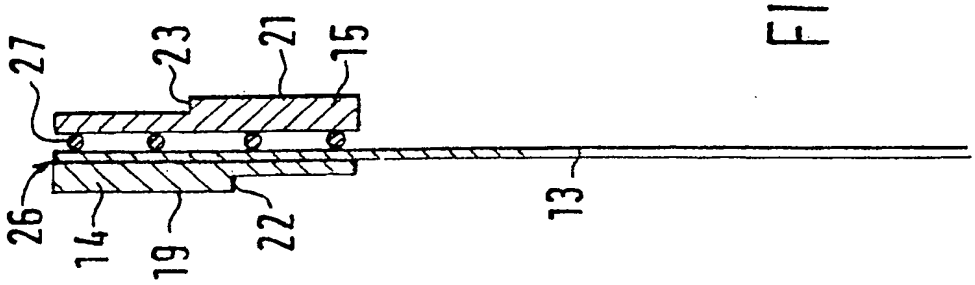

FIG. 3

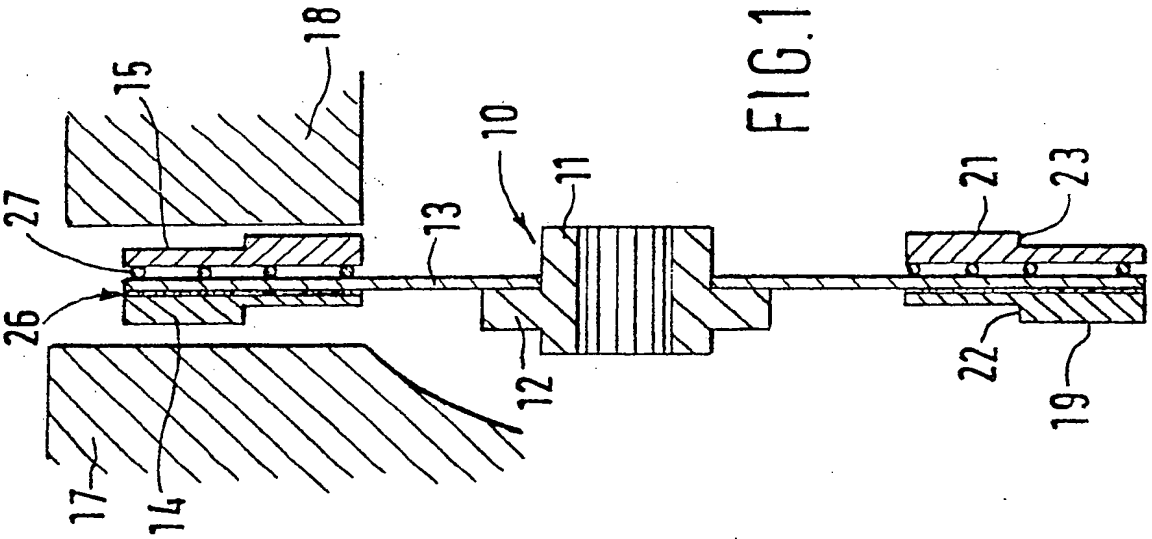

FIG. 1

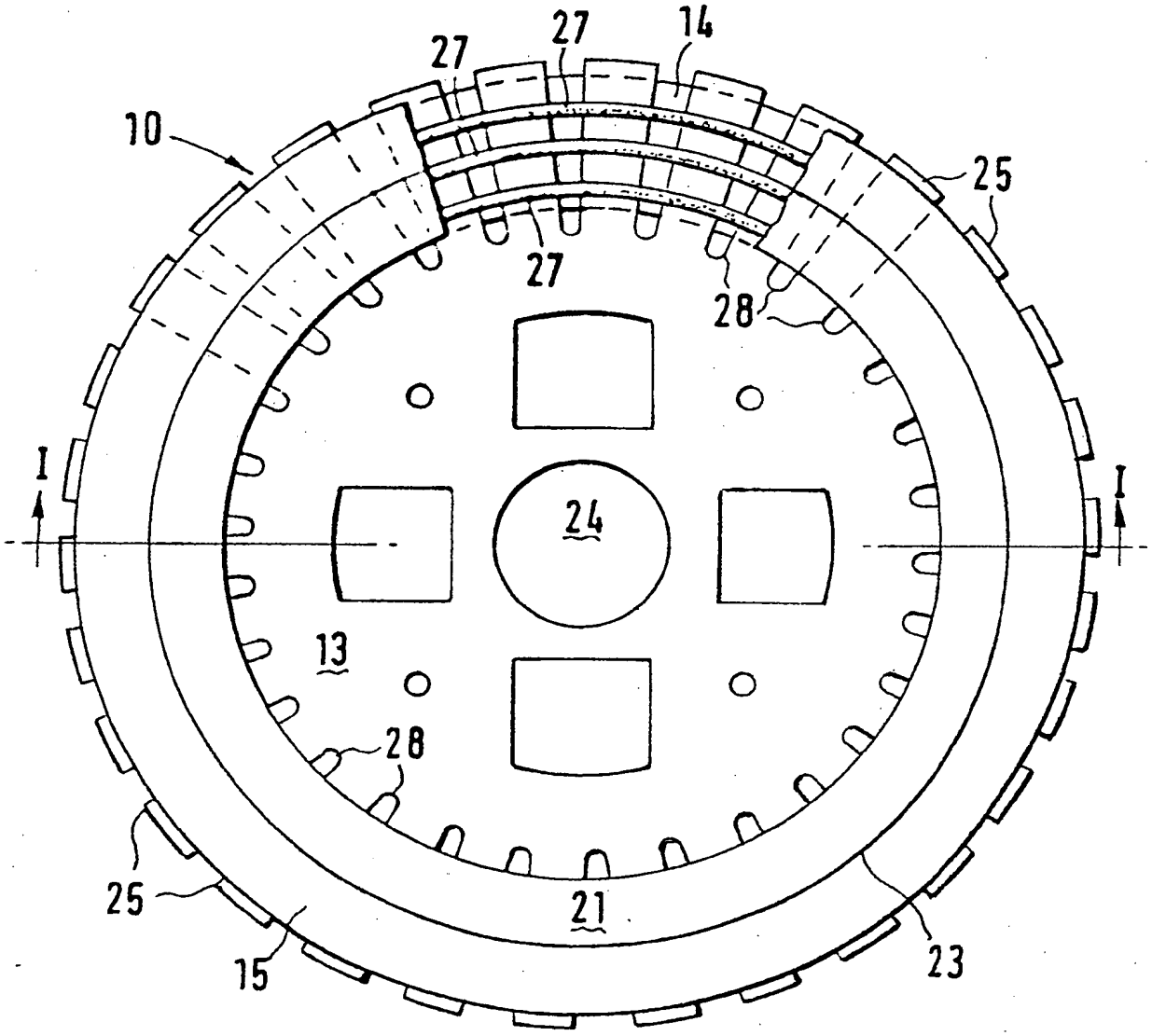

FIG. 2

FRICTION CLUTCH DRIVEN PLATES

This invention relates to dry plate clutch units, particularly though not exclusively used in motor vehicles for releasable driving engagement between the engine and transmission, the design and operation of clutch units of this type being well known in the art.

In clutch units of this type, co-axial annular friction facings of the same internal diameter and radial width are affixed to either side of a clutch driven plate, these facings being normally of identical axial thickness and type of friction material.

In operation the driven plate is sandwiched between the engine flywheel and clutch cover pressure plate, which are braised together by spring means typically a diaphragm spring.

As the driven plate is engaged between flywheel and pressure plate, the take up of the drive may result in clutch judder.

The present invention has been found to ameliorate the problem of clutch judder.

Accordingly there is provided a friction clutch driven plate for releasable clamped engagement between an engine flywheel and a clutch cover pressure plate, and which includes a hub, at least one carrier plate, two annular coaxial friction facings which face in opposite directions and which are supported on a carrier plate characterised in that one friction facing has a different facing contact area then the other friction facing, and the contact area of said one facing extends radially outwardly of the contact area of said other facing which extends radially inwardly of the contact area of said one facing.

Preferably the one facing with the larger mean radius contacts the flywheel, and the other facing with the further mean radius contacts the pressure plate.

The invention will be described by way of example and with reference to the accompanying drawings in which:-

Fig 1 is a schematic section through a friction clutch driven plate according to this invention showing the plate between a flywheel and pressure plate.

Fig 2 is an elevation of the driven plate shown in Fig 1.

Fig 3 is a schematic cross section of a second clutch driven plate also according to the invention.

The clutch driven plate is intended for use in a motor vehicle having a conventional dry plate clutch for releasable driving engagement between the engine and transmission. Since the invention is concerned only with the friction facings reference to other constructional features well known for clutch driven plates will be omitted.

Figs 1 and 2 show a driven plate 10 having an internally splined hub 11 with a radially extending flange 12 to which is capable of limited angular rotation relative to an annular carrier plate 13 as is well known. Annular friction facings 14 and 15 are affixed to the carrier plate 13 towards its outer periphery by adhesive, or may alternatively be rivetted to the plate 13. The friction facing 14 adjacent the engine flywheel 17 has a contact area 19 that comprises the radially outer portion of the facing 14, and the friction facing 15 adjacent the clutch cover pressure plate 18 has a contact area 21 that comprises the radially inner portion of the facing 15.

The contact area 19 extends radially outwardly of the contact area 21, and the contact area 21 extends radially inwardly of the contact area 19. In other words the mean radius of the one contact area 19 is greater than the mean radius of other contact area 21.

In this example the contact areas 19 and 21 have the same radial width and the radially inner periphery 22 of the contact area 19 is in alignment with the outer periphery 23 of the contact area 21.

With reference also to Fig 2 there is illustrated the friction material facings 14 and 15 which are mounted on the steel annular carrier plate 13 having a centre hole 24 for mounting of the plate 13 onto the driven plate hub 12. The carrier plate 13 is formed with windows for receiving torsional damping springs (not shown) and holes for stop rivets (also not shown) in a manner well known in the trade.

The carrier plate 13 has a plurality of radially outwardly extending fingers 25 equiangulary spaced around its outer periphery. Preferably there are thirty fingers 25 but other numbers could be used if desired. The fingers 25 are capable of flexing resiliently to allow axial movement of a friction facing 14 or 15 mounted thereon, the friction facing 20 being somewhat flexible to allow small amounts of axial deformation.

The carrier plate 13 preferably the two friction facings 14 and 15 mounted coaxially thereon, one facing 14 or 15 on each axial side of the carrier plate 13 with the friction contact surfaces 19 and 21 oppositely directed.

The facings 14 and 15 are mounted on the fingers 25 by use of adhesive materials which is laid onto the back face of each facing 14 and 15 to adhere the respective facing to the fingers 25.

At least one of the facings preferably the facing 15 adjacent the pressure plate 18 is secured to the carrier plate 13 by use of concentric stripes of an elastomeric adhesive material 27, preferably a silicone rubber such as RTV7057 sold by Dow Corning, or Elastosil E14 produced by Waker-Chemie Gmbh, or RTV159 produce by the General Electric Company of the USA.

Alternatively a two pack cure silicone rubber can be used.

The silicone rubber can withstand temperatures of upto 250 degrees to 300 degrees centigrade and is sufficiently flexible to provide cushioning between the friction facings 14 and 15.

For a better understanding of the relationship between the resilience of the silicone rubber, the clutch driven plate clamp loads, and the flexibility of the friction facings the reader is directed to the present applicants published European Patent application 0252583A1, and to British Patent GB-A-2240 142.

The facing 14, adjacent the flywheel 17, is secured to the fingers 25 by use of a ridgid epoxy type adhesive 26 such as Redux.

In an alternative embodiment, both friction facings 14 and 15 are secured to the carrier 3 by silicone rubber adhesive laid in substantially identical patterns of three concentric circles.

The spaces 28 between the fingers 25 allow the facings 14 and 15 to flex and the beads or stripes of adhesive 24 on one facing 15 provides axial resilience between the facings 14 and 15.

In yet another embodiment (not shown) of the invention the elastomeric adhesive 24 could be used to adhere the facing 14 to the carrier plate 13, and the rigid adhesive 24 used for securing the facing 15 to the carrier plate 13.

With reference to Fig 3, this embodiment is substantially the same as the embodiment of Figs 1 and 2 excepting that the contract area 19 on the one facing 14 radially overlaps with the contact area 21 of the other facing 15. Both contact area 19 and 21 still have the same radial widths.

In another embodiment not shown, the contact areas 19 and 21 both have different radial widths, but are still

arranged so that the mean radius of the contact area of one of the facings is greater than the mean radius of the contact area of the other facing.

In yet another embodiment, each friction facing 14 and 15 could be secured to a respective carrier plate 13 and the two carrier plates arranged back to back. Such a construction is shown in the application published British Application GBA 2240 607.

CLAIMS

1. A friction clutch driven plate for releasable clamped engagement between an engine flywheel and a clutch cover pressure plate, and which includes a hub, at least one carrier plate, two annular coaxial friction facings which face in opposite directions and which are supported on a carrier plate characterised in that one friction facing has a different facing contact area than the other friction facing, and the contact area of said one facing extends radially outwardly of the contact area of said other facing which extends radially inwardly of the contact area of said one facing.

2. A driven plate as claimed in Claim 1 wherein, in use said one facing will contact the flywheel and said other facing will contact the pressure plate

3. A driven plate as claimed in Claim 1 and Claim 2 wherein the contact area of the two friction facings have the same radial widths.

4. A driven plate as claimed in any one of Claims 1 to 3 wherein there is some radial overlap between the two contact areas.

5. A driven plate as claimed in any one of claims 1 to 4 wherein the two facings are each secured to a carrier plate by means of adhesive, the adhesive for said one facing being a rigid adhesive and the adhesive for said other facing being an elastomeric adhesive having some axial resilience.

6. A driven plate as claimed in Claim 5 wherein both facings are secured to opposite sides of a single carrier plate.

7. A driven plate as claimed in any one of claims 1 to 6 where each carrier plate comprises an annular plate having a plurality of radially outwardly projecting paddles and the attached facing is secured to the paddles so that the facing carrier assembly is axially flexible.

Patents Act 1977
Examin r's report to the Comptroller under Section 17 (The Search Report)

Application number

9121025.2

Relevant Technical fields

(i) UK Cl (Edition K) F2C

(ii) Int Cl (Edition 5) F16D

Search Examiner

A BURROWS

Databases (see over)

(i) UK Patent Office

(ii)

Date of Search

3 JANUARY 1992

Documents considered relevant following a search in respect of claims 1-7

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
A	GB 2021709 A (AUTOMOTIVE PRODUCTS)	

SF2(p)

tp - c:\wp51\doc99\fil000128

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

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